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REMARKS

Reconsideration of the application is requested.

Claims 1-5 and 7-12 remain in the application. Claims 1-5, 7 and 8 are subject to examination and claims 9-12 have been withdrawn from examination. Claims 1, 7 and 8 have been amended. Claim 6 has been canceled.

In item 2 on pages 2-3 of the above-identified Office Action, claims 1-2 and 5-8 have been rejected as being obvious over U.S. Patent No. 6,094,305 to Shiraishi (hereinafter Shiraishi) in view of U.S. Patent No. 5,673,103 to Inoue et al. (hereinafter Inoue) under 35 U.S.C. § 103.

The rejection has been noted and claim 1 has been amended in an effort to even more clearly define the invention of the instant application. Support for the changes is found in original claim 6, on page 11, lines 1-8, and on page 20, lines 5-11 of the specification of the instant application.

According to amended claim 1, the invention relates to a method of characterizing an illumination source in an exposure apparatus. The mask has a front surface with an opaque layer (double slit) that faces the illumination source. During illumination, an interference pattern is imaged on the rear surface being formed by the transparent mask substrate. It

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should be noted that the two substantially parallel slits are used as an interfering double slit, as known from basic quantum mechanics. This is considerably different to just imaging the pattern of the slit, as known in the prior art. In order to be able to function as an interfering double slit, several conditions have to be fulfilled. One basic condition is that the thickness between the opaque layer on the first side and the surface on the second side of the mask, and/or a respective width of the mutually parallel slit structures to make a quotient of twice the square of the width and the thickness be less than the wavelength, as described on page 20 ($\lambda > 2s^2/z$). Otherwise, the result would simply be just a projection of the slit opening onto the rear side of the mask, which would then not allow determining characteristics of the illumination source. The interference image is transferred with considerable contrast through the objective lens into the substrate plane. The image profile resulting in the substrate plane is analyzed to obtain a light distribution representative of the illumination source. Therefore, a simple image of the slit pattern is not provided, rather a double-slit interference on the transparent mask substrate is generated.

Turning now to the prior art, Shiraishi shows an exposure method using a reticle with a pattern of alternate transmission portions. While Shiraishi requires a certain

thickness of the mask substrate, Shiraishi only considers the thickness of the phase shift layer. This is a conventional procedure when applying phase shift masks. As described on column 9, lines 61 to 64, the alternate transmission portions are formed as bare surface portions and phase shift transmission portions on the side opposing the illumination source. Accordingly, Shiraishi does not provide two mutually parallel slits on a transparent substrate having a thickness between the opaque layer on the first side and the surface on the second side of the mask, and/or a respective width of the mutually parallel slit structures to make a quotient of twice the square of the width and the thickness be less than the wavelength as recited in amended claim 1 of the instant application.

In summary, Shiraishi shows that the mask has the phase shift pattern oriented such that the pattern does not face the illumination source in contrast to the invention of the instant application. Shiraishi does not show an opaque layer being formed on the front which faces the illumination source. For this feature, the Examiner relies on Inoue. Furthermore, Shiraishi does not show selecting the thickness of the substrate of the phase-shift mask. What is shown, is that the phase shifting material has been selected so as to provide the intended amount of phase shift. This condition is, however, different from the condition to allow imaging of an

U.S. Patent No. 4,885,232 to Spak (hereinafter Spak) or U.S. Patent No. 6,699,628 to Shima (hereinafter Shima) under 35 U.S.C. § 103.

Amended claim 1 is believed to be allowable, and as claims 3 and 4 depend on claim 1, they are also believed to be allowable.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1 or 8. Claims 1 and 8 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 1.

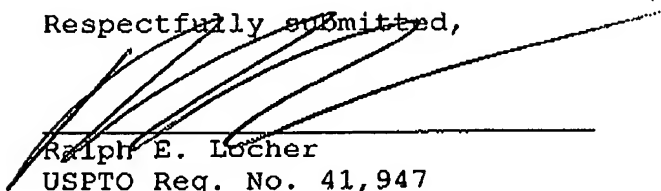
In view of the foregoing, reconsideration and allowance of claims 1-5 and 7-12 are solicited.

If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner

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Respectfully submitted,



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